

A STUDY ON THE GENUS *CRANAELLA* RAMME (ORTHOPTERA, ACRIDOIDEA, CATANTOPINAE)

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With 30 text-figures and one plate

ABSTRACT

Morphological characters of all previously recognized species of the genus *Cranaella* Ramme are given, together with the descriptions of three new species: *kevani*, *rammei*, and *samarensis*. A key is given to the species of this genus, which occurs in the Philippines and Celebes.

INTRODUCTION

Material of *Cranaella* is scarce. Ramme, when creating this genus, recorded four adult females and one juvenile male, representing three new species: *carnipes*, *tuberculata* and *willemsei*. C. Willemse (1956) mentioned another two females and two males, one male as *willemsei*, the other specimens as *tuberculata*. Kevan (1966) recorded another two males and one female as *tuberculata* and described a fourth species, *multicolor*, after a single female. Before me I have a collection of 30 males and 17 females. In the present study morphological characters, especially of the genitalia, are given, and three new species are described.

Depositories of the material are given throughout the text in abbreviated form:

ANSP Academy of Natural Sciences of Philadelphia, U.S.A.;

BPBM Bernice P. Bishop Museum, Honolulu, Hawaii;

NMM Natuurhistorisch Museum, Maastricht, Netherlands;

ZMHU Zoologisches Museum der Humboldt-Universität, Berlin, Germany.

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Cranaella Ramme

Cranaella Ramme, 1941: 94, 217, 226, 241; C. Willemse, 1956: 9, 108.

Type-species: *Cranaella carnipes* Ramme, 1941.

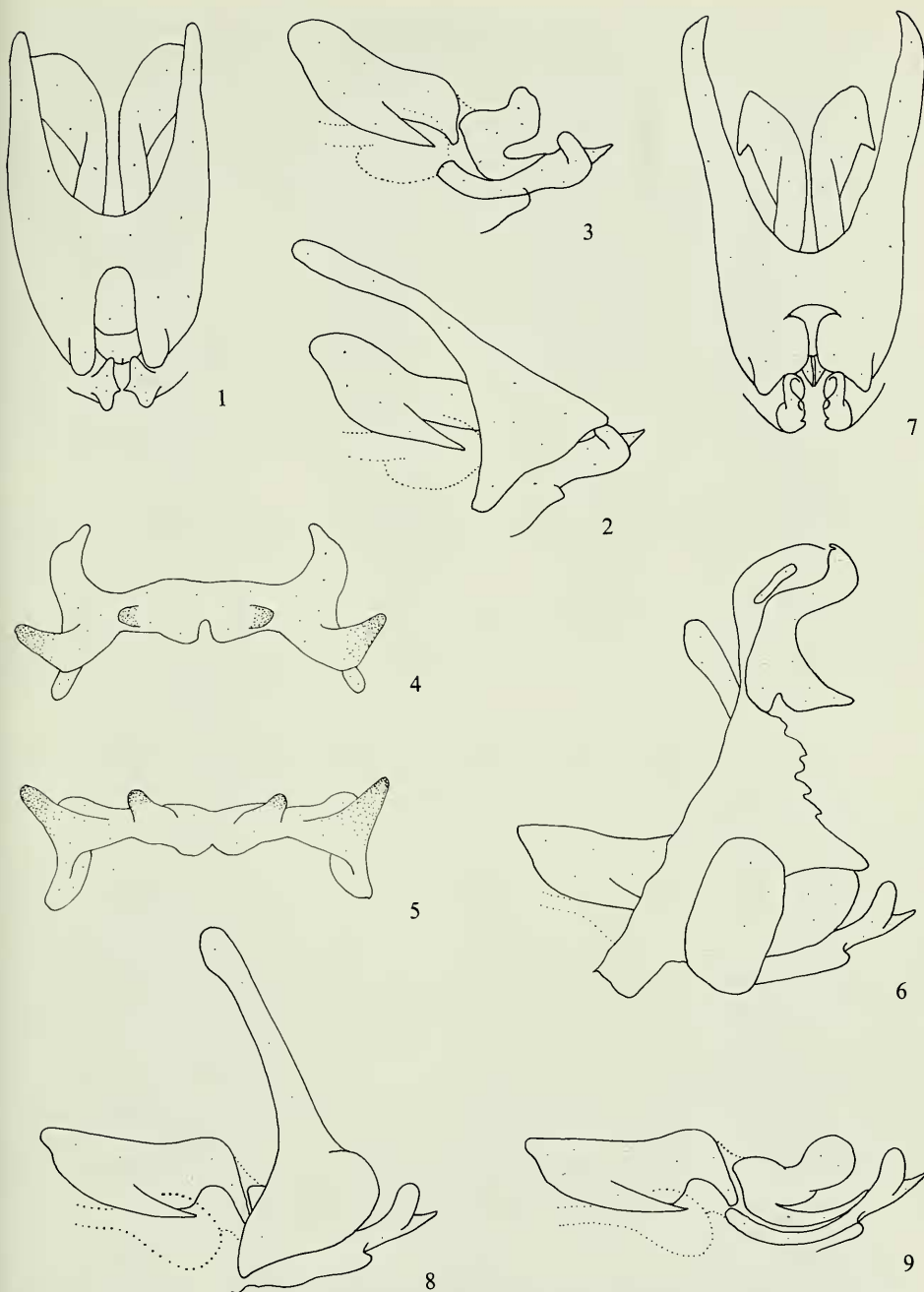
Cranaella belongs to the *Cranae* group of genera, preliminarily arranged under the subfamily Catantopinae. In the original description it is said that *Cranaella*

differs from *Cranae* Stål in the rougher sculpturation of head and thorax, the less strongly developed pronotal sulci and narrower elytra, with the hind margin (not "Vorderrand") slightly concave. However, as to these points the discontinuity between these genera is merely gradual. Also the genitalia are much the same in both genera. It is not within the scope of the present study to discuss the status of the genera of the *Cranae* group. Therefore I abstain from redescribing *Cranaella* more definitely. However, phenetic relationships of *Cranaella* species both mutually as well as with species of the *Cranae* complex (s.l.) are pointed out here.

In *Cranaella*, specific characters may be found in the apex of the phallus and the hind margin of the last abdominal tergite in the male, in the subgenital plate in the female and in the sculpturation of the hind femur, in the shape of the prosternal process, in the development of the hind wing and the shape of the elytron, and in the coloration in both sexes.

Key to the species of *Cranaella*

1. Hind femur sanguineous (Celebes) *carnipes* Ramme (p. 112)
— Hind femur not red (Philippine Is.) 2
2. Elytron wider, about two-and-one-half times as long as wide, yellowish green without black venation, reaching the margins *multicolor* Kevan (p. 119)
— Elytron narrower, three times or more as long as wide, venation by far not reaching the (slightly transparent) margins, the area of venation black 3
3. Ridges of the fishbone pattern of the outer medial area of the hind femur of same colour as the hind femur; each ridge with an, often black, tubercle near the lower and usually also near the upper carinulae; prosternal process widened laterally, lateral edge of apex slightly conical; hind wing vestigial 4
— These ridges in black, contrasting with the colour of the hind femur and without tubercles; prosternal process almost cubical, lateral edges of the apex not conical; hind wing present, although shorter than the elytron 5
4. Hind margin of last abdominal tergite in male not or slightly incised in the middle, without furculae (fig. 20); apex of phallus with distal part distinctly marked off from the proximal part of the apex (figs. 10—11)
 *tuberculata* Ramme (p. 112)
— This margin with a pair of small and widely separated furculae (fig. 21); apex of phallus with distal part gradually merging in the proximal part (figs. 12—13)
 *kevani* sp.n. (p. 115)
5. Hind margin of the last abdominal tergite in male shallowly emarginate in the middle, without furculae (fig. 22); apex of phallus with short distal part (figs. 14—15) *willemsei* Ramme (p. 116)
— This margin with a narrow incision in the middle and a pair of furculae (figs. 23—24); distal part of apex of phallus longer (figs. 16—19) 6
6. Distal part of apex of phallus comparatively long (figs. 16—17)
 *rammei* sp.n. (p. 118)
— Distal part of apex of phallus comparatively short (figs. 18—19)
 *samarensis* sp.n. (p. 118)



Figs. 1—5. *Cranaella tuberculata* Ramme, ♂, Surigao, phallic complex: 1, dorsal view, ectophallic membrane and epiphallus removed; 2, the same, lateral view; 3, endophallus, lateral view; 4, epiphallus, dorsal view; 5, the same, posterior view. Figs. 6—9. *Cranaella willemsei* Ramme, ♂, Surigao, phallic complex: 6, lateral view; 7, the same, epiphallus and ectophallic membrane removed, dorsal view; 8, the same, lateral view; 9, endophallus, lateral view.

***Cranaella carnipes* Ramme, 1941**
(fig. 25)

Cranaella carnipes Ramme, 1941: 94, 217, 228, pl. 14 fig. 3; C. Willemse, 1956: 108, 109.

This species is known from the type-specimens, an adult female (holotype) and a juvenile male (paratype). Both are labelled: Celebes Ile Ile 500 m 11.12.1930 G. Heinrich (ZMHU). Ramme's description is extremely short; his description of the coloration refers to the juvenile male; that of the holotype was given by C. Willemse.

Morphological characters of the holotype are as follows: integument finely pitted, impressions closely set; prosternal process widened laterally, lateral edges slightly conical; elytron about three times as long as wide, hind wing vestigial; ridges of outer medial area of hind femur not tuberculate; subgenital plate (fig. 25) flattened ventrally and depressed apically, hind margin tridentate with the lateral points almost as wide and long as the median point.

The juvenile male has the hind margin of the last abdominal tergite with a pair of small, triangular and widely separated furculae, resembling those of *kevani*. The tegmina are not yet developed. The phallic complex is so poorly sclerotized that details cannot be given.

Although the prosternal process and the tegmina are much as in *tuberculata* and *kevani*, the relationship of *carnipes* remains an open question by lack of an adult male.

***Cranaella tuberculata* Ramme, 1941**
(figs. 1—5, 10—11, 20, 26, pl. 1 figs. 1—2)

Cranaella tuberculata Ramme, 1941: 95, 217, pl. 13 fig. 6; C. Willemse, 1956: 108, 109.

Material studied: Surigao, Mindanao, Baker 4♂ 3♀; Surigao, P.I., 9.vi (1♀) & 9.v.1916 (1♂); Surigao, Mindanao 2♂ 1 juv. ♂, 2♀ 1 juv. ♀; Iligan, Mindanao, Baker 1♂; Butuan, Mindanao, Baker 1♂ 1♀; Bucas, Philipp. 1♂; Siargao, Philipp. 1♀; Island Samar, Baker 2♂ 1♀; Isl. Biliran, Philippines, Baker 1♂; Dagami, Leyte, P.I., Mt. Lobi 21 (1♂) & 25 (1♀) & 26.vi (1♀) & 4 (2♂) & 10.viii (1 juv. ♂) & 26 (1♂) & 27.ix.1945 (1♀), E. R. Helwig (all ANSP, except 1♂ 2♀ from Surigao in NMM).

This species was described after the female holotype from Mindanao and a female paratype from Siargao. A description of the male characters was given by C. Willemse after a male from Surigao (Mindanao). The redescription which follows here is made after (topotypic) material from Mindanao.

Redescription.

♂, pl. 1 fig. 1. Integument of face, cheeks, thorax and dorsal sides of proximal abdominal tergites evenly and strongly pitted. Head as long as the pronotum. Pronotum with four transverse sulci, the fourth one located at about 5/6 of the length of the middle of the dorsum; posterior margin of dorsum broadly emarginate; lateral lobe 1/4 longer than high, posterior angle slightly produced

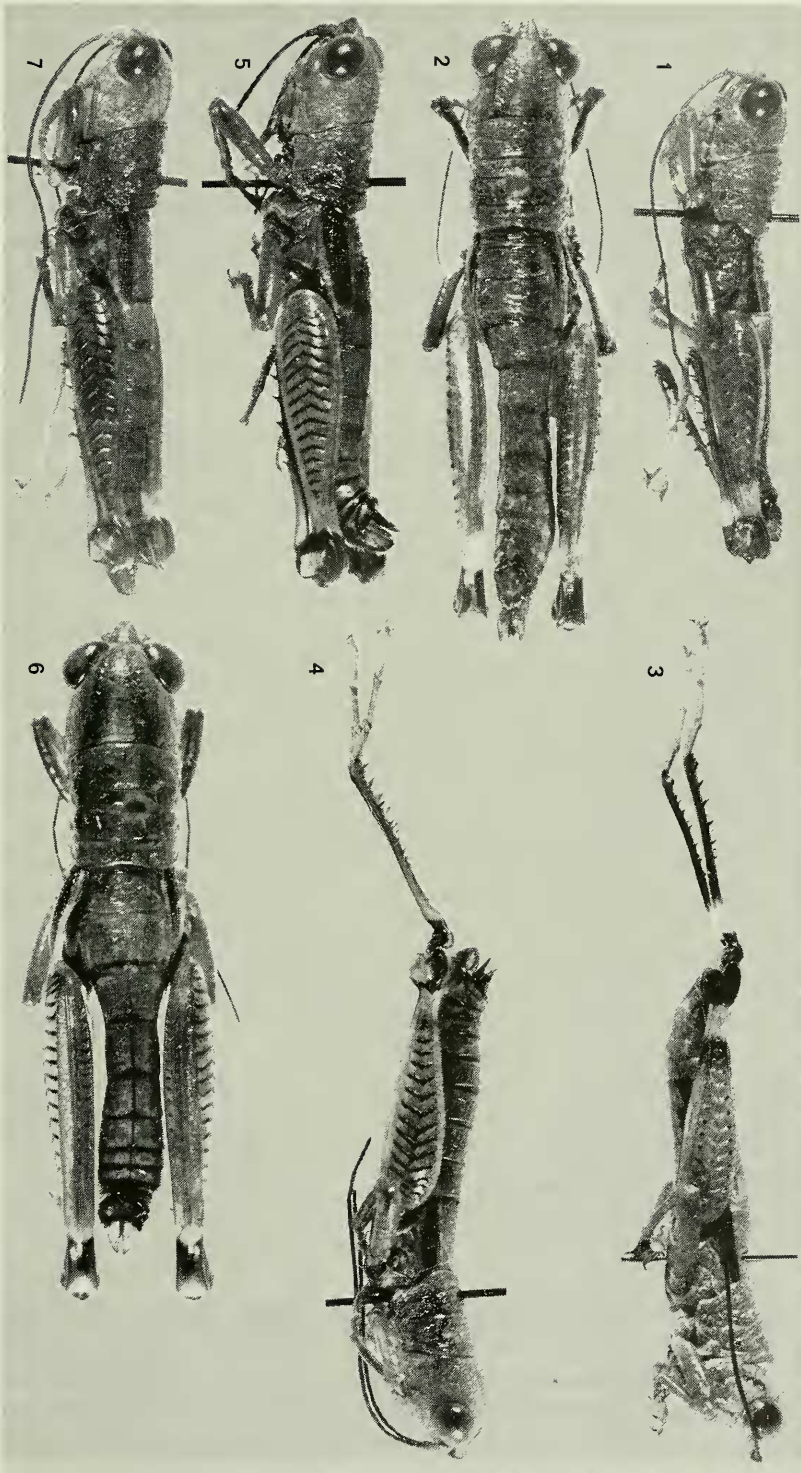


Plate 1, figs. 1—7. *Cranaella* species: 1, *tuberculata* Ramme, ♂, Surigao; 2, idem, ♀, Surigao; 3, *kevani* sp.n., ♂ holotype; 4, *willemsei* Ramme, ♂, Dinagat; 5, *rammei* sp.n., ♂ paratype; 6, idem, ♀ paratype; 7, *samarensis* sp.n., ♂ holotype.

posteriorly, ventral and posterior margins sigmoid. Prosternal process strong, vertical, slightly widened laterally, anterior side slightly longer than posterior one, ventral side flattened with the anterior margin straight or slightly convex, the posterior margin strongly convex, being curved towards the anterior margin, the lateral edges slightly produced conically. Elytron narrow, three to three-and-one-half times as long as wide, venation strongly reduced and confined to the middle area; the broad margins almost completely transparent, anterior margin slightly convex, posterior margin slightly concave, both margins about parallel, apex broadly rounded. Hind wing vestigial. Tympanum open, almost circular, on level with the body surface. Outer side of hind femur with the carinulae slightly tuberculate and the lower and upper ends of the ridges of the fishbone pattern more conspicuously tuberculate. Brunner's organ present. Lower inner carinula pilose.

Hind margin of the last abdominal tergite (fig. 20) widely concave, slightly thickened near the middle and shortly and narrowly incised in the very middle. Supra-anal plate (fig. 20) wider than long. Phallic complex and epiphallus as in figs. 1—5. Apex of phallus (figs. 10—11) with the ventro-posterior side strongly concave and the distal part of the apical penis valve distinctly marked off from the proximal part of the apex by a lateral collar-shaped fold.

General colour yellowish or reddish-brown. Antennae bluish-black, apical segments slightly paler, basal segments coloured as the head. Head of general colour or olivaceous green, clypeus with a median black dot and its lateral angles black. Thorax of general colour except for the ventral side of the prosternal process, the posterior margin of the pro- and the lateral margins of the mesosterna, which are bluish. Elytron with the area of venation black or dark blue. Abdomen of general colour, last tergite, cercus and margins of the supra-anal plate dark brown or blue. Fore and middle legs and hind femur of general colour or more reddish. Hind femur with the tubercles of the ridges of the fishbone pattern black; the lower inner marginal area bluish; a yellow or greenish antegenicular ring, often bordered with black proximally. Hind knee bluish-black, apex of the lobes yellowish and crescents castaneous-brown. Hind tibia and its condylus bluish-black, with a yellow postgenicular ring; spines with tips black. Hind tarsus bluish-brown, ventral side paler.

♀, pl. 1 fig. 2. Larger than male. Ventral side of subgenital plate depressed in the middle, the depression bordered laterally by a pair of strong and posteriorly slightly divergent keels, giving rise to a tridentate hind margin with the lateral points smaller than the median point (fig. 26). Coloration as the male.

Measurements (length in mm): body, ♂ 21.1-25.2, ♀ 23.5-32.0; pronotum, ♂ 3.8-4.3, ♀ 4.9-5.9; elytron, ♂ 4.1-4.5, ♀ 4.9-6.0; hind femur, ♂ 11.1-12.1, ♀ 13.0-15.5.

Distribution: Philippine Is. (Mindanao; Bucas; Siargao; Samar; Leyte; Biliran).

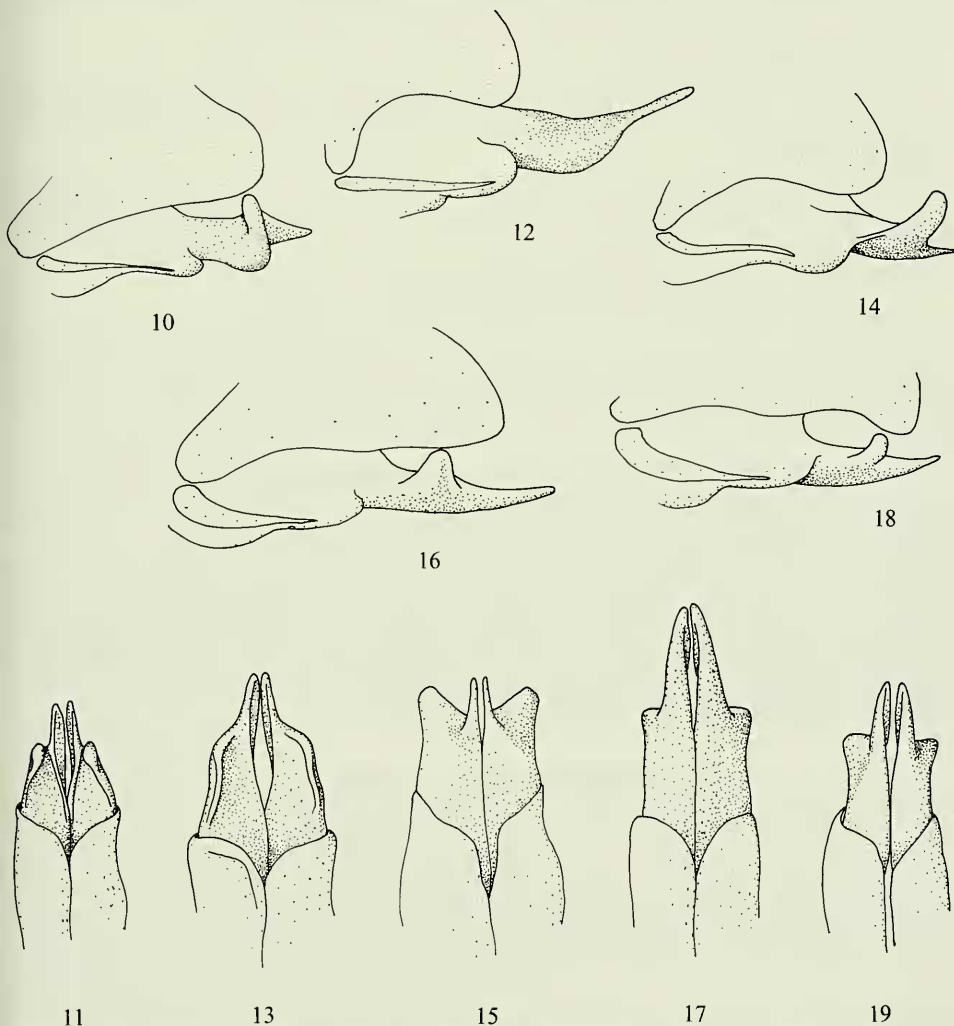
Discussion. The species is well-defined by the male genitalia. Among the material at hand, morphological characters vary but slightly. However, as to the coloration, the material from Samar and that from Leyte and Biliran is different from that of Mindanao. The pronotum of the Samar specimens has two black dots,

at the lateral ends of the second transverse sulcus. The material from Leyte and Biliran shows more or less numerous black dots scattered over the head and pronotum and almost unicolorous tubercles of the outer medial area of the hind femur.

***Cranaella kevani* sp.n.**
(figs. 12—13, 21, 27, pl. 1 fig. 3)

Cranaella tuberculata (nec Ramme); Kevan, 1966: 411.

Material studied: ♂ holotype, ♀ allotype, labelled: P.I., Misamis Or., Mt.



Figs. 10—19. *Cranaella* species, ♂, apex of phallus in ventro-posterior (odd numbers) and lateral (even numbers) view: 10—11, *tuberculata* Ramme, Surigao; 12—13, *kevani* sp.n., Calian; 14—15, *willemsi* Ramme, Surigao; 16—17, *rammei* sp.n., paratype; 18—19, *samarensis* sp.n., holotype.

Empagatao, 1050—1200 m, 19-30.iv.61, H. Torrevillas collector; paratypes: P.I., Misamis Or., Minalwang, 1050 m, 24.iii-4.iv.1961, W. Torrevillas 1 ♂ (all three specimens BPBM and labelled: *Cranaella tuberculata* Rm det.D.K.McE.Kevan 1965); Calian, Davao Prov., Mindanao, P.I., 10.v.1930, C. F. Clegg 1 ♂; Island of Basilan, Baker 2 ♂ 1 ♀ (ANSP).

Description.

♂, pl. 1 fig. 3. Differs from *tuberculata* as follows. Pronotum slightly shorter, posterior margin of dorsum slightly emarginate. Hind margin of last abdominal tergite emarginate in the middle, with a pair of short and well separated furculae (fig. 21). Distal part of the apical penis valve not strongly marked off but more gradually merging in the proximal part of that valve (figs. 12—13).

Coloration as in *tuberculata*.

♀. Larger than male. Subgenital plate resembling that of *tuberculata*, but the keels slightly closer together (fig. 27). Coloration as in male, slightly more obscurely brownish.

Measurements (length in mm): body, ♂ 21.1-24.8, ♀ 27.0-30.9; pronotum, ♂ 4.0-4.1, ♀ 5.0-5.3; elytron, ♂ 3.8-4.6, ♀ 4.5-5.5; hind femur, ♂ 11.6-13.0, ♀ 13.9-15.0.

Distribution: Philippine Is. (Mindanao; Basilan).

Discussion. The species is well-defined by the male genitalia. The furculae may be slightly more widely separated than in the holotype. Specimens from Basilan differ slightly in the smaller measurements, the presence of a black dot at either end of the second transverse pronotal sulcus, and the unicolorous elytron in the female.

The material from Misamis Or. had been referred to *tuberculata* by Kevan. In that paper, the locality of the firstly recorded male (now paratype) is erroneously given similar to that of the following couple (now holo- and allotype).

Within the genus, *tuberculata* and *kevani* form a group characterized by the shape of the prosternal process, vestigial hind wing, tuberculated ridges of the fishbone pattern of the hind femur, and the appearance of the apex of phallus. As to the latter, especially in *kevani*, resemblance with the apex of phallus in *Cranae patagiata* Stål (type-species of that genus) is obvious.

Cranaella willemsei Ramme, 1941

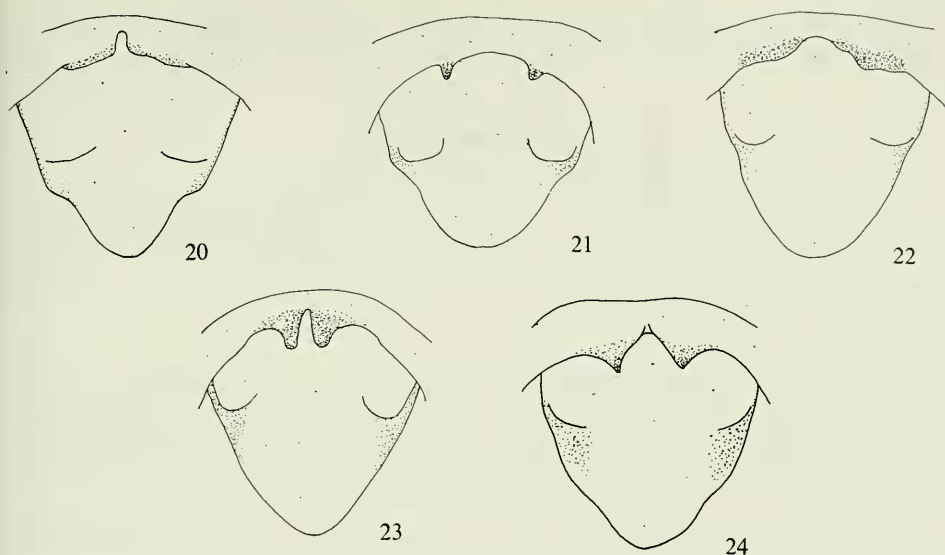
(figs. 6—9, 14—15, 22, 28, pl. 1 fig. 4)

Cranaella willemsei Ramme, 1941: 95, 218; C. Willemse, 1956: 108, 109.

Material studied: Surigao, Philipp. 1 ♂ (NMM), 1 ♀ (ANSP) (topotypes); P.I., Dinagat, Panamana, 20.iii.1945, H. H. Roberts 1 ♂ (ANSP).

Redescription.

♂, pl. 1 fig. 4. Differs from *tuberculata* as follows. Integument finely pitted, impressions weaker and smaller. Head slightly longer. Prosternal process thick, strong, roughly cubical, slightly curved anteriorly, basally slightly narrower than



Figs. 20—24. *Cranaella* species, ♂, supra-anal plate and hind margin of last abdominal tergite, dorsal view: 20, *tuberculata* Ramme, Surigao; 21, *kevani* sp.n., holotype; 22, *willemsei* Ramme, Surigao; 23, *rammei* sp.n., paratype; 24, *samarensis* sp.n., holotype.

apically, anterior side higher than posterior one, ventral side quadrate and flattened obliquely. Elytron wider, about three times as long as wide, hind margin almost straight, venation extending over a larger area. Hind wing about three quarters length of elytron, with some indistinct veins. Ridges of the fishbone pattern of the outer medial area of the hind femur prominent but without tubercles. Outer carinulae of hind femur slightly tuberculate. Hind margin of last abdominal tergite thickened, widely and weakly emarginate in the middle and with no more than an indication of a pair of furculae (fig. 22). Supra-anal plate longer than wide (fig. 22). Phallic complex as in figs. 6—9. Apex of phallus (figs. 14—15) with the ventro-posterior side slightly flattened and the tip divided into a narrow, short, medio-distal process and a stronger, auricular, lateral lobe, which is curved dorso-anteriorly.

Coloration about as in *tuberculata*, differing mainly in the ridges of the outer medial area of the hind femur which are black, sharply contrasting with the brownish colour of the hind femur.

♀. Larger than the male. Subgenital plate (fig. 28) slightly longer than wide, ventrally slightly depressed in the middle, keels moderately developed, hind margin slightly tridentate, the median point more extending posteriorly than the obtuse lateral ones. Coloration as in the male.

Measurements (length in mm): body, ♂ 25.0-26.1, ♀ 28.5-31.4; pronotum, ♂ 4.4-4.5, ♀ 5.0-5.8; elytron, ♂ 4.0-4.2, ♀ 6.4-6.7; hind femur, ♂ 12.5-13.4, ♀ 14.3-14.5.

Distribution: Philippine Is. (Mindanao; Dinagat).

Discussion. The species is well-defined by the male genitalia. The position among the other species of the genus will be discussed under *samarensis*.

***Cranaella rammei* sp.n**
(figs. 16—17, 23, 29, pl. 1 figs. 5—6)

Material studied: ♂ holotype, ♀ allotype, 2♂ 1♀ paratypes, labelled: Dagami, Leyte, P.I., Mt. Lobi, 10 (1♂) & 21 (1♂) & 25.vi (allotype) & 4 (1♀) & 10.viii.1945 (holotype), E. R. Helwig (ANSP).

Description.

♂, pl. 1 fig. 5. Differing from *willemsei* as follows. General appearance more robust. Hind margin of last abdominal tergite (fig. 23) with a narrow median incision, bordered laterally by a pair of narrow, obtusely pointed furculae. Apex of phallus more elongate, distal process longer and lateral lobe moderately developed (figs. 16—17).

Coloration as in *willemsei*. Posterior veins of elytron sometimes yellowish white.

♀, pl. 1 fig. 6. Larger than the male. Subgenital plate (fig. 29) more elongate than in *willemsei*, hind margin more produced posteriorly. Coloration as in the male.

Measurements (length in mm): body, ♂ 24.2-25.1, ♀ 29.0-34.1; pronotum, ♂ 4.4-4.5, ♀ 5.8-6.0; elytron, ♂ 4.5-5.2, ♀ 5.9-6.1; hind femur, ♂ 13.3-14.2, ♀ 16.7-17.0.

Distribution: Philippine Is. (Leyte).

Discussion. The species is well-defined by the male genitalia. There are no previous records. Its position among other species will be discussed under *samarensis*.

***Cranaella samarensis* sp.n.**
(figs. 18—19, 24, pl. 1 fig. 7)

Material studied: ♂ holotype, labelled: Island Samar, Baker (ANSP).

Description.

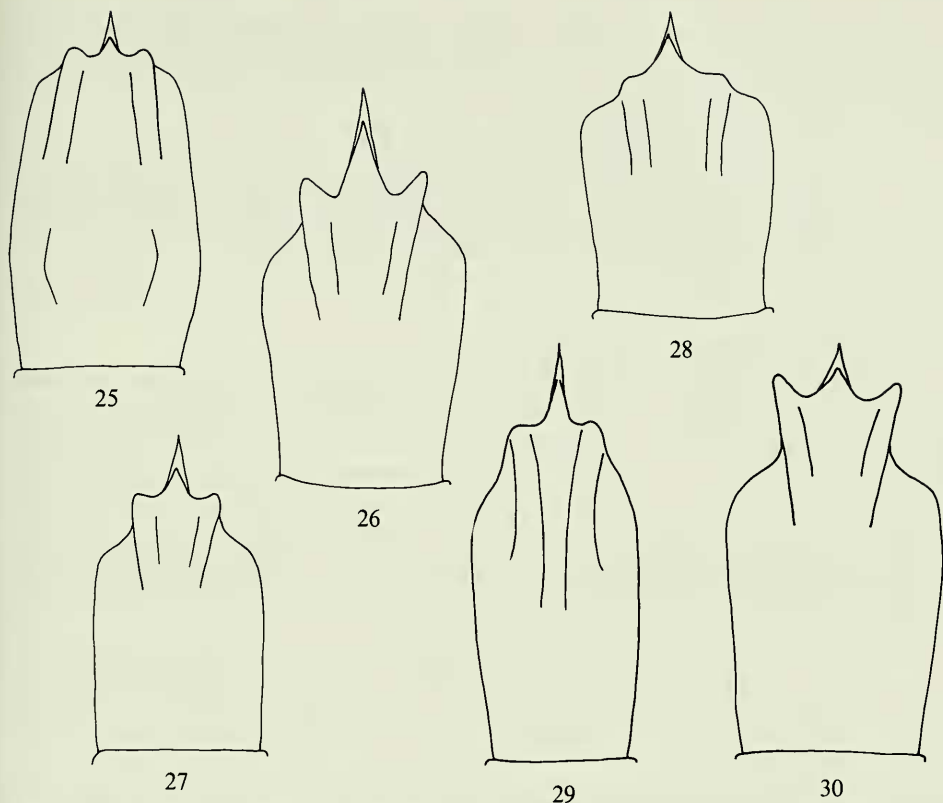
♂, pl. 1 fig. 7. Much as *willemsei*, differing in abdominal terminalia. Furculae of hind margin of last abdominal tergite large, triangular, apex pointed (fig. 24). Apex of phallus with distal process and lateral lobe intermediate between those in *willemsei* and *rammei* (figs. 18—19). Coloration as in *willemsei*.

♀. Unknown.

Measurements (length in mm): ♂, body 26.2, pronotum 4.4, elytron 4.9, hind femur 13.1.

Distribution: Philippine Is. (Samar).

Discussion. The species is defined by the furculae and the apex of phallus. Together with *willemsei* and *rammei*, the three species form a species-group characterized by the shape of the prosternal process, hind wings, apex of phallus, and



Figs. 25—30. *Cranaella* species, ♀, subgenital plate, ventral view: 25, *carnipes* Ramme, holotype; 26, *tuberculata* Ramme, Surigao; 27, *kevani* sp.n., allotype; 28, *willemsei* Ramme, topotype; 29, *rammei* sp.n., paratype; 30, *multicolor* Kevan, holotype.

black fishbone pattern of the hind femur. Both the hind wing, as well as the less pitted integument and the shape of the apex of phallus, are intermediate between the *tuberculata-kevani* group of *Cranaella* and some species of *Cranae*.

***Cranaella multicolor* Kevan, 1966**
(fig. 30)

Cranaella multicolor Kevan, 1966: 41, pl. 3 figs. c—d.

This species was described after a single female from La Lun Mts., Davao Prov., Mindanao.

Marked characters may be summarized here: Pronotum with the posterior margin of the dorsum straight; posterior margin of the lateral lobe not sigmoid but straight and the lower posterior angle not produced; first transverse sulcus lacking on the dorsum and the fourth one placed more anteriorly. Prosternal process vertical and widened laterally. Elytron wide, about two-and-one-half times as long

as wide, posterior margin nearly straight, venation reaching the margins. Hind wing vestigial. Fishbone pattern of outer side of hind femur not tuberculate. Hind margin of subgenital plate strongly tridentate, the lateral points as long as and wider than the medial point (fig. 30).

Coloration. Head yellow with chocolate-brown stripe over occiput and behind eyes. Pronotum chocolate-brown. Elytron green, yellowish at base. Hind femur ochreous yellow, suffused blue-black in basal third, carinulae and fishbone pattern unicolorous. Hind knee without ante- or postgenicular rings.

Measurements (length in mm): ♀, body 28.5, pronotum 5.0, elytron 6.5, hind femur 19.5.

Distribution: Philippine Is. (Mindanao).

Discussion. The shape and venation of the elytron, the shape of the pronotum and the coloration disagree with other members of *Cranaella*. Its placement in this genus is doubtful. Pronotum and elytron agree rather with *Paracranae* C. Willemse from Celebes. However, the hind margin of the female subgenital plate and the fastigium verticis are different in that genus. A similar shape of elytron is found in *Cranae luctuosa* C. Bolívar and *Cranae kuekenthali* Brunner, both from the Moluccas. As the male of *multicolor* is unknown, a more precise allocation of the species has to be postponed.

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